

APPENDIX C.

Methods for Summarizing Climate Data for the Great Lakes Inventory and Monitoring Network

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This document describes the methods we used to construct Table 3 in Chapter 1 of the Great Lakes Inventory and Monitoring Network (GLKN) Phase 2 Report.

The National Park Service does not have a standardized method of collecting surface meteorological data in the GLKN parks. The best source of standardized, long-term, rural climatic data in the U.S. is from National Oceanic and Atmospheric Administration's (NOAA's) Cooperative Summary of the Day (TD3200) dataset. Since the later half of the 19th century, climate data have been collected by volunteers at thousands of sites around the country each day. The longevity of any particular station varies, but many stations have 20-40 years of daily data.

To approximate the climate within a park, we selected stations in the immediate vicinity that had substantial, recent, climatic data within the TD3200 dataset (Exhibit 1). Stations were selected not solely based on the distance to the park boundary, but also on the likelihood that they were climatically similar to at least a portion of the park. Between one and three stations were used for each of the nine parks. The ranges given in Table 3 of the Phase 2 Report show annual variation at the stations. Spatial variation within each park is almost certainly greater than the annual variation at the recording stations. The names and codes of stations used to derive park estimates are given below, along with the years for which data were available.

The summary statistic for each climatic parameter was calculated using NOAA's method for missing data interpolation, excluding any year that had a month with three or more missing values. Each station was treated as an independent observation and annual values were averaged to arrive at a park value, except in the case of snowfall when lake-effect snowfall was considered to be unrepresentative of park conditions.

Lake-effect snowfall is a localized phenomenon, and can vary greatly over distances of hundreds of meters based on wind currents and elevation. For APIS, the Bayfield station was a better indicator of park snowfall than the Ashland station, and it alone was used for calculation of snowfall averages. At INDU, the Hobart station experienced less lake-effect snowfall than the Michigan City and Ogden Dunes stations, and it was excluded from snowfall calculations. PIRO and SLBE have the greatest amount of lake-effect snowfall, and portions of those parks have substantially more snowfall than the station locations, at least double the given station measurements for some elevated locations within those parks.

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Exhibit 1. Weather station names and codes and years of data available for National parks in the Great Lakes Inventory and Monitoring Network.

Station Name and Code	Park	Data years
Pigeon River 216505	GRPO	1948-1950, 1951-1980
Grand Portage 213296	GRPO	1989-present
Bayfield 470603	APIS	1940-present
Ashland 470349	APIS	1901-1993, 1998-present
Big Falls 210746	VOYA	1948-present
Intl' Falls 214026	VOYA	1948-present
Kettle Falls 214306	VOYA	1948-1982
MSP Airport 215435	MISS	1948-present
Munising 205690	PIRO	1912-1930, 1943-2001
Spooner 478027	SACN-N	1907-present
Stillwater 218037	SACN-S	1948-present
St. Croix Falls 477464	SACN-S	1950-present
Frankfort 202984	SLBE	1949-1952, 1965-present
Maple City 205097	SLBE	1959-present
Hobart 124008	INDU	1920-1999
Ogden Dunes 126542	INDU	1952-1988
Michigan City 125607	INDU	1960-1970